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Evidenced-based ICU Organisation: Interview with Professor Jeremy Kahn

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Jeremy Kahn is Professor of Critical Care, Medicine and Health Policy in the University of Pittsburgh School of Medicine and Graduate School of Public Health. As a core faculty member in the CRISMA Center in the Department of Critical Care Medicine, he directs the CRISMA Program on Critical Care Health Policy & Management. His research focuses on the organisation, management, and financing of critical care services. His group's work integrates approaches from the fields of epidemiology, health services research, health economics and operations management to investigate novel strategies for increasing the quality and efficiency of critical care. He directs several grants from the National Institutes of Health examining the effect of ICU organisation on the outcome of care for critical illness. Dr. Kahn spends his clinical time attending in the ICU of Magee Womens Hospital of University of Pittsburgh Medical Center.

On organising critical care for the 21st century, you suggested how to address the challenges (Costa and Kahn 2016). What would you say is most important? What is most difficult?

In our article for JAMA, we examined the major gaps in critical care delivery and suggested how to fix these gaps over the next 20 to 30 years. To me, the most important aspect is inter-professional critical care. Increasingly we recognise that critical care is not just a relationship between a physician and a patient, but there is an inter-professional care team that includes physical therapists, respiratory therapists, pharmacists, and nurses, who are at the bedside 24 hours a day. Family members are also part of the care team. The most important innovation of critical care in the last ten years and how we will continue to improve care moving forward is by emphasising the role of that inter-professional team including the family. To say critical care is a team sport feels like a platitude, but it is so true that one individual alone simply cannot deliver the level of critical care needed to consistently save lives and improve the experience of patients and families. I value my inter-professional care team deeply; I can't envision working in an ICU without them.

The most difficult thing to accomplish will be regionalised critical care, which means that the very high-risk, most severely ill patients should be systematically triaged and transferred to regional centres of excellence. I am an advocate of this approach, and although there is a lot of data to support it the political challenges are potentially too great and it may take many years to be fully realised. There are many people who develop critical illness while already in the hospital, and it is not clear if they should leave the clinicians that already know them and are experienced with them and move to these high quality centres. There are reimbursement issues also. While trauma care has been regionalised, it is very poorly reimbursed and community hospitals were relatively willing to give it up. Critical care is well reimbursed, and hospitals are not going to be so willing to have critical care patients transferred to regional centres. Also critical care supports so many other services in the hospital, such as oncology and cardiac surgery, that when you take critical care away from a small hospital it might be ultimately harmful. We need to recognise that regionalising critical care is difficult, and while pursuing it, think about ways to support quality in small hospitals in the absence of regionalisation.

You are principal investigator of the ConnECCT study: Contributors to Effective Critical Care Telemedicine. What can you tell us about this study?

The most salient observation in the ICU telemedicine literature is that telemedicine is a heterogeneous intervention with varying effects: sometimes it works and sometimes it doesn't. It is a very powerful tool for quality improvement, but it is just a tool. There is even data to suggest that introducing ICU telemedicine sometimes causes harm in hospitals. The most important question is not whether telemedicine is a good idea, but where and how it should be used.

The ConnECCT study, which is funded by the U.S. National Institutes of Health, acknowledges telemedicine's heterogeneity and asks: "Why are some hospitals very good at implementing telemedicine and why are some hospitals not implementing it very well?" We are visiting high performing and low performing hospitals to see if we can learn lessons from each, and we will develop an implementation toolkit to include how best to implement telemedicine and where to implement it.

Telemedicine is perhaps best suited for small, typically rural hospitals, where distance plays a large factor. Yet it is implemented quite frequently in large academic medical centres, unfortunately, for unclear reasons—maybe because they are well resourced and can afford telemedicine. However, the data might show that telemedicine improves outcomes more in smaller hospitals.

See Also: What's the future of intensive care medicine?

It is important for telemedicine to work well that the hospitals involved have pre-existing relationships. We have learned in our study the importance of trust: the nurses and clinicians at the bedside really have to trust the telemedicine doctors. You can't engender trust remotely if you have never met someone. It is very important to have face-to-face contact. In addition, we have found that telemedicine works best when the doctors in the telemedicine suite also work at the bedside. They have opportunities to develop trust with the nurses, because that is so important for quality.

Your study on implementation of evidence based practice in Pennsylvania hospitals found variable implementation and also increases in some non-evidence based practices (Kohn et al. 2017). What are your thoughts on adoption and de-adoption of evidence?

I think adoption and de-adoption is going to be a central challenge in critical care in the next century. We are finally coming to a realisation that doctors are just human beings. As much as we want to believe that we can reliably deliver best practice, we have to admit to ourselves that as human beings we consistently fail. Understanding the reasons why we are good and why we are bad at adopting practice and understanding how to de-adopt more efficiently when evidence shows we shouldn't be doing something, will be a central challenge. It will take a multipronged approach, and we can learn lessons from behavioural economics and "nudge" concepts that can push us gently to adopting best practice. We can also take lessons from organisational behavior and theory to get teams to work together better. Traditional methods, such as education and guidelines dissemination, are not enough. Looking at implementation of the Surviving Sepsis guidelines there have been three studies showing that even after aggressive implementation only about a third of patients with sepsis were receiving the 6-hour resuscitation bundle. That demonstrates that we need more innovative and intense methods for implementation. Technology can also help— electronic screening for best practices and using the electronic health record to better translate evidence into practice can take us part of the way there, but ultimately it is going to be the human element and finding ways to get humans work together better.

What research are you conducting into teamwork?

We are trying to take a different approach to understand the role of teamwork. Although everyone agrees that teamwork is important, it needs to be studied rigorously, because we don't know why it is important and therefore we don't know how to make it better. It is not enough to say that teamwork is important. We need to understand the mechanism in order to make teams function better, so that in ICUs where teams are not functioning we can intervene to make them more effective.

Saying teamwork is important is like saying that the sky is blue. But if it is a cloudy day and I want to make the sky blue or a little bit more blue, how can I do that?

Issues in teamwork vary. There might be a dysfunctional leader, or 10 consultants who work in an ICU, of which 8 are fantastic and 2 are not so good. But we don't want high quality care 80% of the time. I hope that by understanding team learning as a mechanism for more effective teamwork in ICU we can recommend interventions. We can't assume that every intensivist is going to be a great leader naturally.

Do intensivists get enough training on leadership?

No. It is not part of the medical school curriculum, and there should be formal training in organisation and management, because so much of what we do as intensivists is management. The clinical decisions that we make and the science is a large, but not the entire part, of the skills of being an intensivist. For example, we are now just realising that end-of-life care is not something that comes naturally. Talking to a family

member about end-of-life care is a learned skill. At Pittsburgh we are offering our fellows and intensivists formal training on how to communicate about end-of-life care. Why shouldn't we also provide formal training in communication strategies for teamwork and management? This is an extremely important part of intensivist training that has been neglected.

Your research interests include system and organisation-based interventions that you say can be as beneficial in improving outcomes as new technologies. Of the interventions you have researched, what would you say is the most promising?

Most promising for me is prompting for best practice, meaning having a very simple cue to a clinician that they have forgotten to do a practice and that they need to do it. There are two excellent studies on prompting information. One was a study at Northwestern Medicine in Chicago by Curtis Weiss and colleagues: they were using a checklist on rounds and they randomised two teams (Weiss et al. 2011). Both used the checklist, but in one team there was a human prompter on rounds, who spoke up whenever they noticed something on the checklist that was not discussed. That prompting intervention alone was able to reduce mortality. In Pittsburgh we used a telehealth approach (Kahn et al. 2014), where we had a nurse screening each patient daily for evidence-based practice, and when they found it was missing they called the ICU and told the nurse and prompted them. Prompts are very powerful tools, because they are simple and targeted and not diffused. They are a just-in-time form of education that is potentially underutilised. However, human prompters are expensive, and we need ways to automate that system using technology. That has to be done smartly, because we don't want to have too many prompts, which may lead to alarm fatigue.

Please tell us about your research on a web-based patient-reported outcome system (Cox et al. 2016).

The critical care field is shifting towards greater examination of long-term outcomes and increased attention to ICU survivorship. Death is not the worst of all possible outcomes. We need to better understand the patient experience in recovery and how patient experience is affected by the therapies that we give them. Patient-reported outcomes are the very important next step to ensuring that our research is much more patient-centred. Just saying that a patient is alive one year after discharge is not enough anymore. And just measuring health-related quality of life using existing scales is not sufficient. To really improve long-term patient outcomes we need to understand and quantify outcomes as articulated by the patient. It's hard to follow up patients, and getting them to understand how to use patient-reported outcome systems is a challenge, but these are surmountable issues.

Do many ICUs in the U.S. have 24-hour visiting?

It is a mixture. The ICU I work in has 24-hour visitation, which is wonderful. On the other hand, I have had loved ones in ICUs recently where visiting was 1 hour in the morning and 1 hour in the evening. In the room my loved one was in, even if you could stay longer there was nowhere to sit. There was one chair and that was for the nurse, and the nurse made it very clear that it was not for family. I spoke to the hospital administration about it, and even gave them the consensus statements about the importance of 24 hours visitation. There is still the lingering old guard in some hospitals that work with the old mindset that the patient needs peace to recover. My belief is that we as clinicians are the visitors, we are the guests, and the family has a right to be there 24 hours a day.

What else will make critical care more patient-centred?

One of the depressing things that I see is that when we round as an inter-professional care team, we round outside in the hallway and not next to the patient's bed. This is because we have all the computers and the infection control issues and moving into the room is seen as too much of a challenge. Ultimately we become numbers doctors rather than people doctors. I am trying to think through ways that despite having all these computers on rounds we can bring rounds more frequently into the patient's room right by the bedside in order to engage the patient more.

We are moving towards less sedation and even patient-controlled sedation (there is a clinical trial underway (clinicaltrials.gov/ct2/show/NCT01606852). This will mean that patients are more awake and engaged. We are also facilitating ways for patients to speak when they are mechanically ventilated. These are major steps forward to more patient-centred critical care.

On big data you say you are a skeptic. Why?

I am a skeptic generally of technology, and I feel that big data as it is been applied is seen as a panacea that ultimately is going to potentially steer us wrong as much as it steers us right. The size of the data sets alone won't overcome bias. Moreover I don't believe that you can determine causation in an observational data set. Ultimately we can't abandon randomised clinical trials as a road to causation. I make my living with observational research, but I don't pretend I can infer causation from observational research. Time and time again there has been a difference between observational studies and clinical trials. A smart way to use big data is to use it to inform clinical trials to better understand

disease phenotypes for randomisation into clinical trials to better understand the range of potential outcomes and to embed clinical trials into existing clinical care. An example of this is the Randomized, Embedded, Multifactorial Adaptive Platform Trial for Community-Acquired Pneumonia (REMAPCAP) clinical trial (clinicaltrials.gov/ct2/show/NCT02735707). But to say that the answer lies in big data I say is quite overly optimistic.

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